

ROSAMUNDA



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EN 476 SHIP DESIGN II, SPRING 2005

THE MISSION

- Offshore cruising, Survival up to sea state 9+
 - Cutter-rigged sailing vessel
 - Classical aesthetics
 - Crew of seven; Watch team of two
 - Newest technology and systems
-
- Traditional style... Modern convenience

Parametric Analysis

- Based on Full Keel vessels of 38'- 50' LWL
- 39 vessels used:
 - 15 between 60' and 70' LOA
 - 9 between 45' and 50' LWL

Parametric Analysis



Brilliant

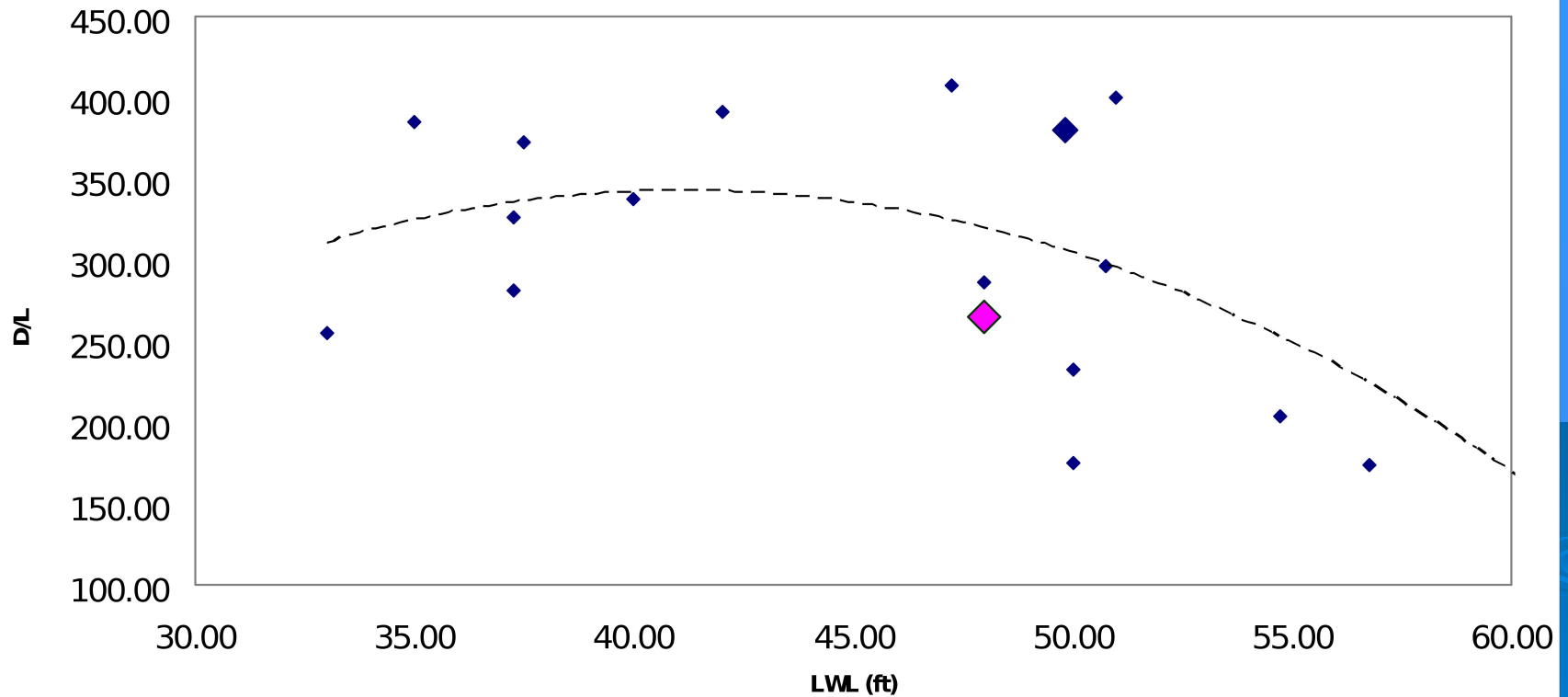


Stormy
Weather



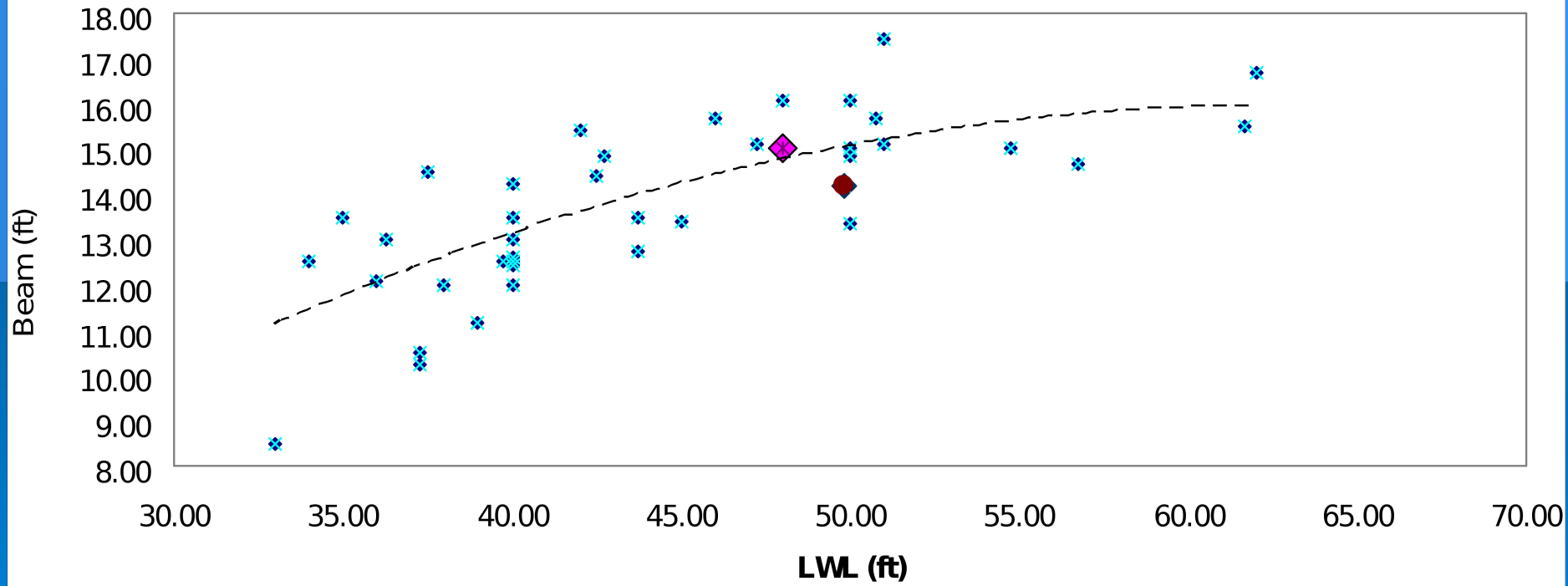
Parametric Analysis

Displacement to Length Ratio

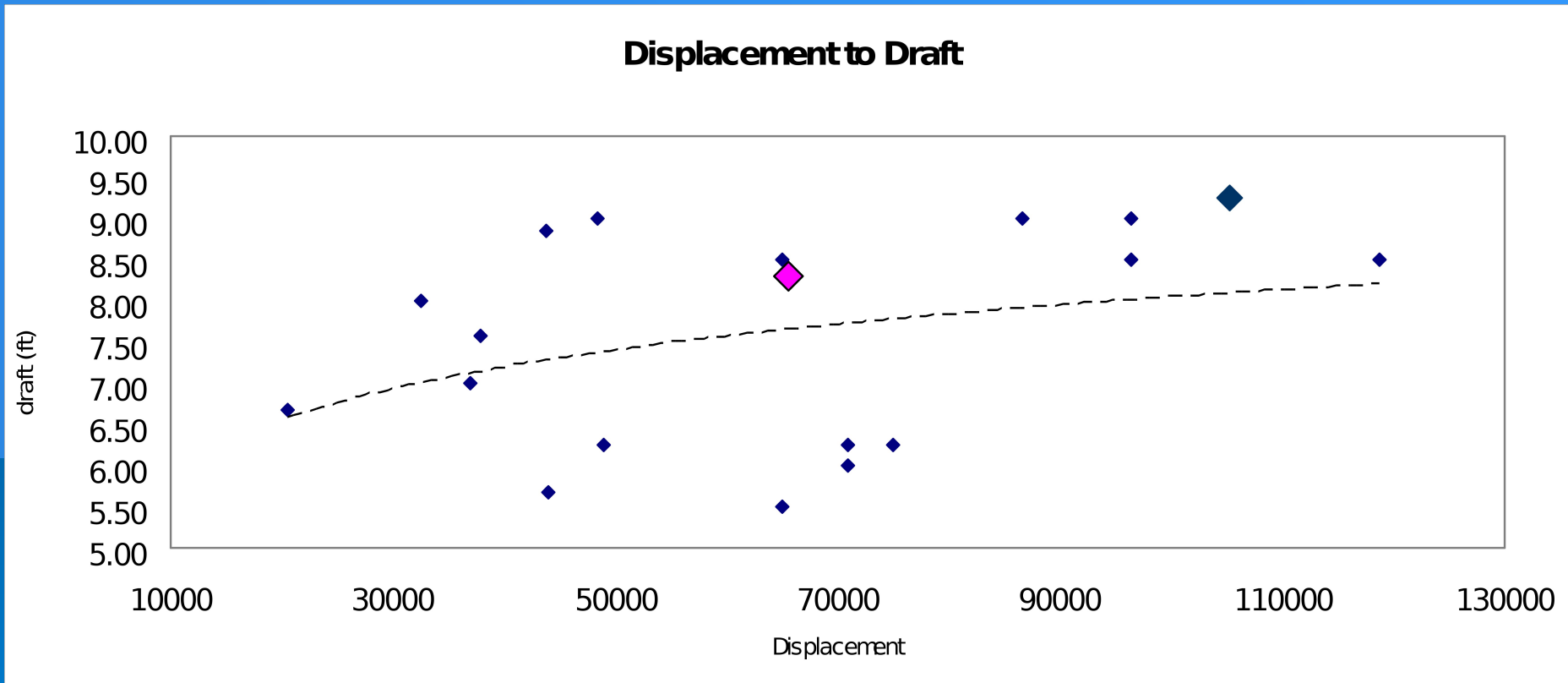


Parametric Analysis

Length to Beam

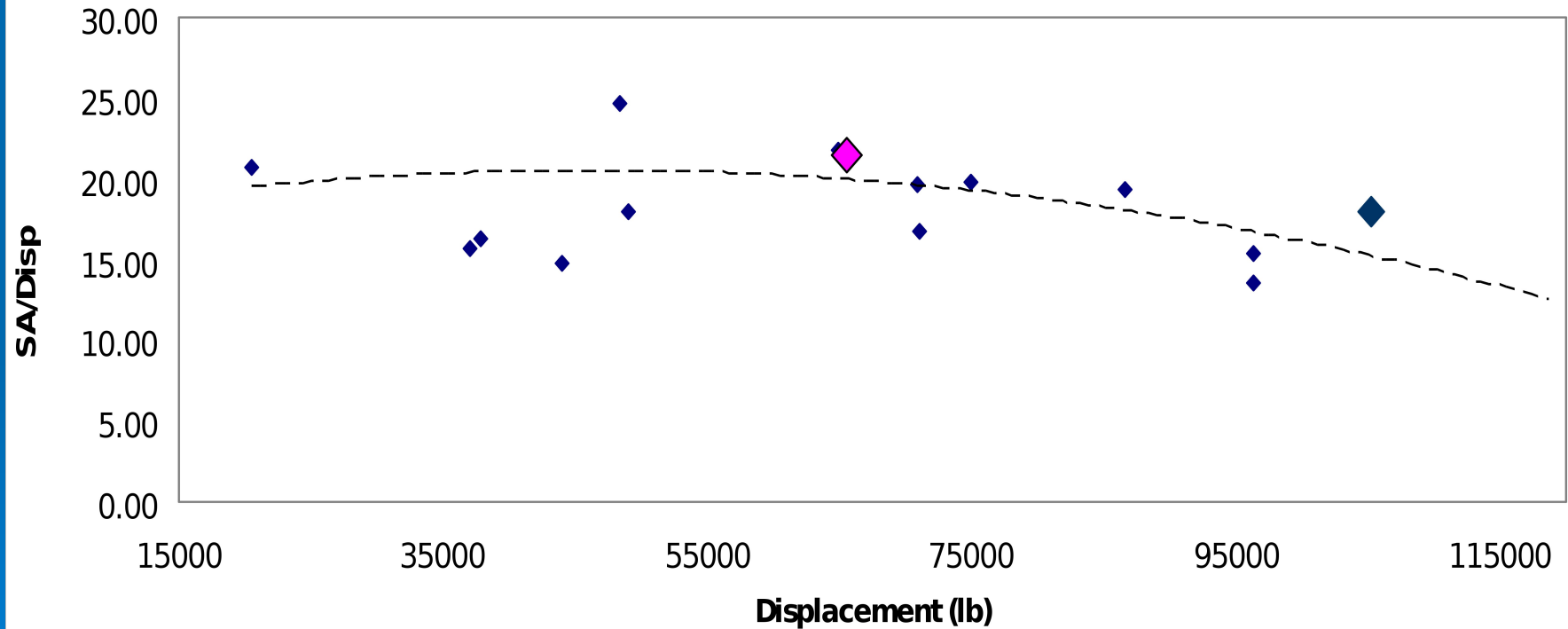


Parametric Analysis



Parametric Analysis

Sail Area to Displacement Ratio



Principal Dimensions

Principal Dimensions and Ratios


LOA	62.5'	L/Δ Ratio	264.69
LWL	46.25'	SA	2186 ft²
Sailing WL	48.20'	SA/ Δ Ratio	21.51
B	15'	BHP	97 hp
T	8.3'	Cp	0.59
Δ	71808 lb	Cb	0.19
		Cm	0.35
		Cwp	0.64
		Awp	444

Principal Dimensions

Performance Estimation

Capsize screening factor	1.45	(<2.0 is good)
motion discomfort ratio	58.41	range 30-60
overhang ratio	0.26	
Waterplane loading Coefficient	161.73	lb/ft²
hull speed est.	9.11	kt
ballast ratio	27.85	%

HULL CHARACTERISTICS

- Graceful Overhangs
 - Sharp Ends
 - Smooth sheer line
 - Low profile good for seakeeping
- 
- The background of the slide is a solid blue color. In the bottom right corner, there are several faint, concentric circles that resemble ripples in water, creating a decorative effect.

Lines/ Hull Model



Weights and Centers

Full Load

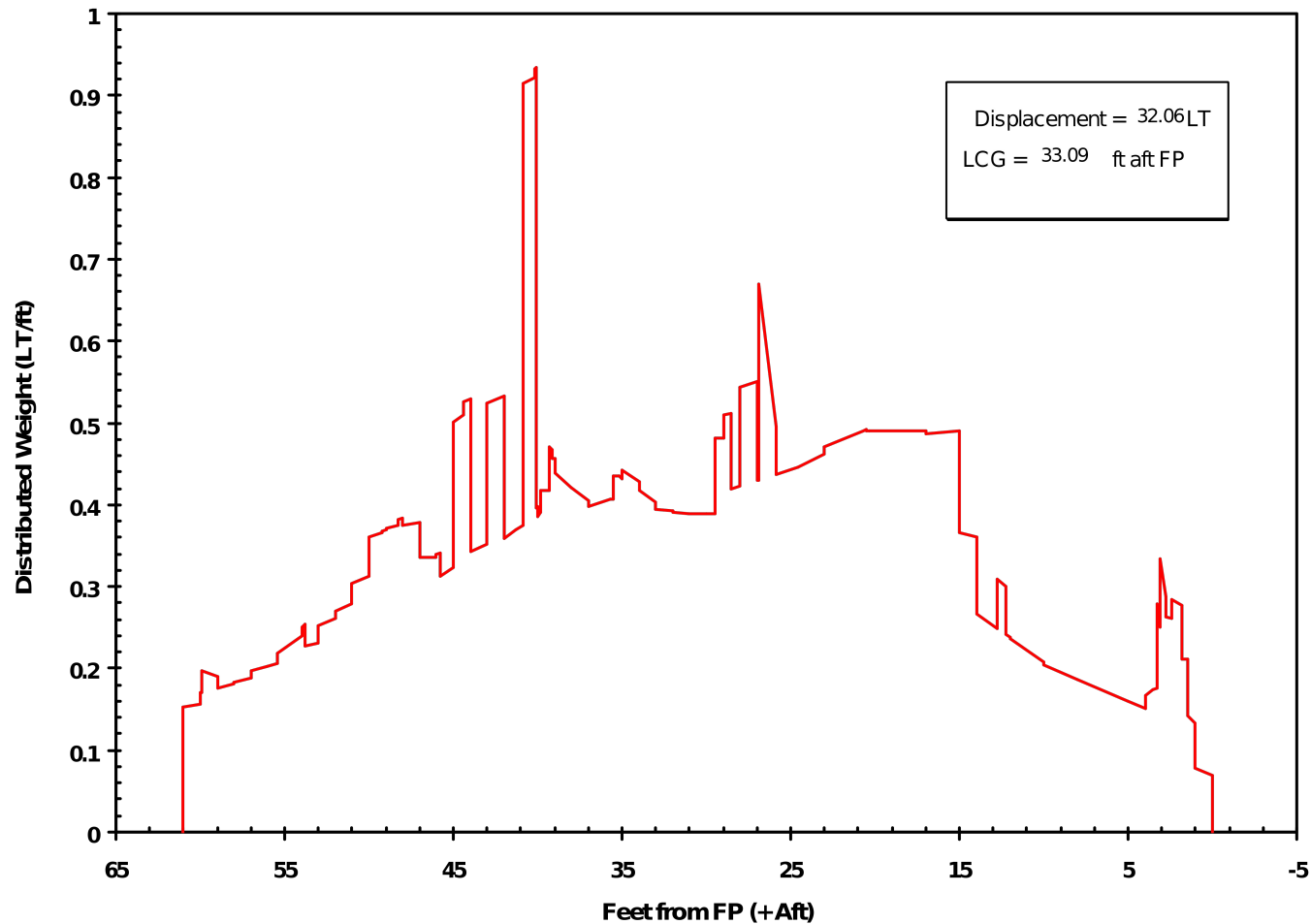
- Total weight: 71,808.97 lbs
- 32.06 LT
- LCG (aft of FP): 33.09 ft
- TCG (+ = stbd of CL): 0.009 ft
- VCG: 6.9 ft

Weights and Centers

Light Ship

- Total weight: 65,571.2 lbs
29.273 LT
- LCG (aft of FP): 40.17 ft
- TCG (+ = stbd of CL): 0.466 ft
- VCG: 6.9 ft

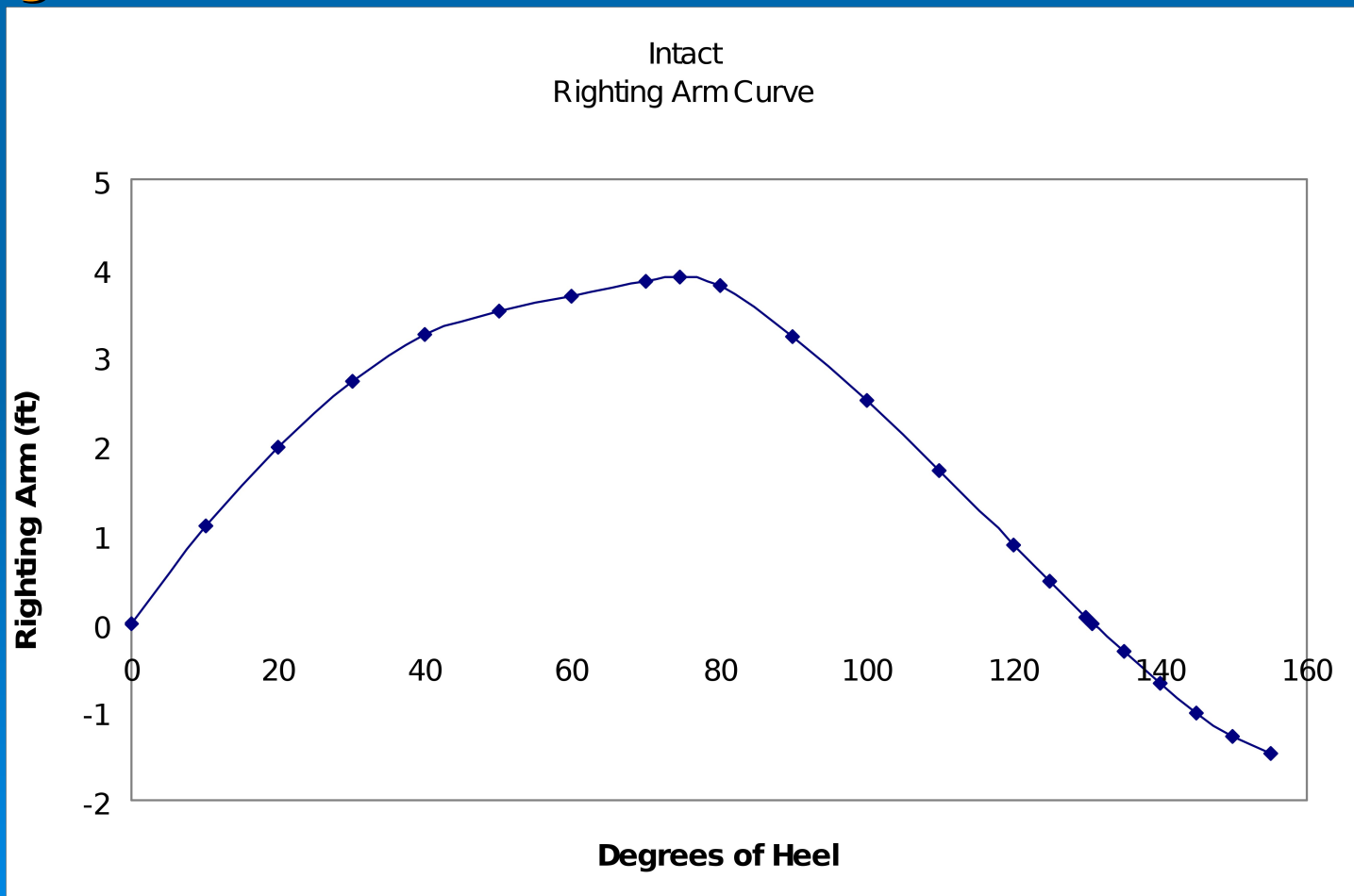
Rosamunda Weight Curve



Intact Stability

- Limit of Positive Stability: 130 deg

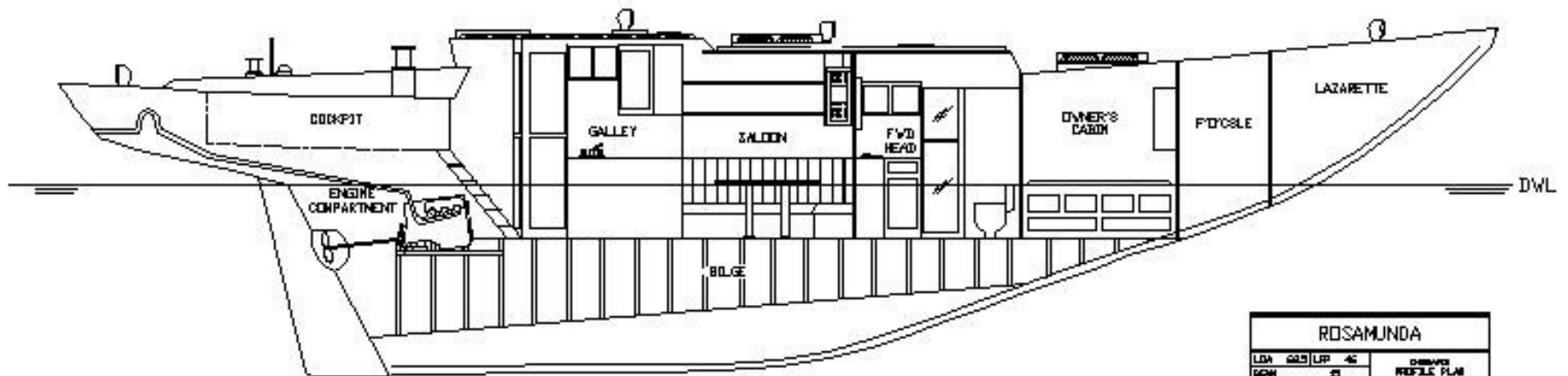
Based on GHS model



Outboard Profile



Inboard Profile

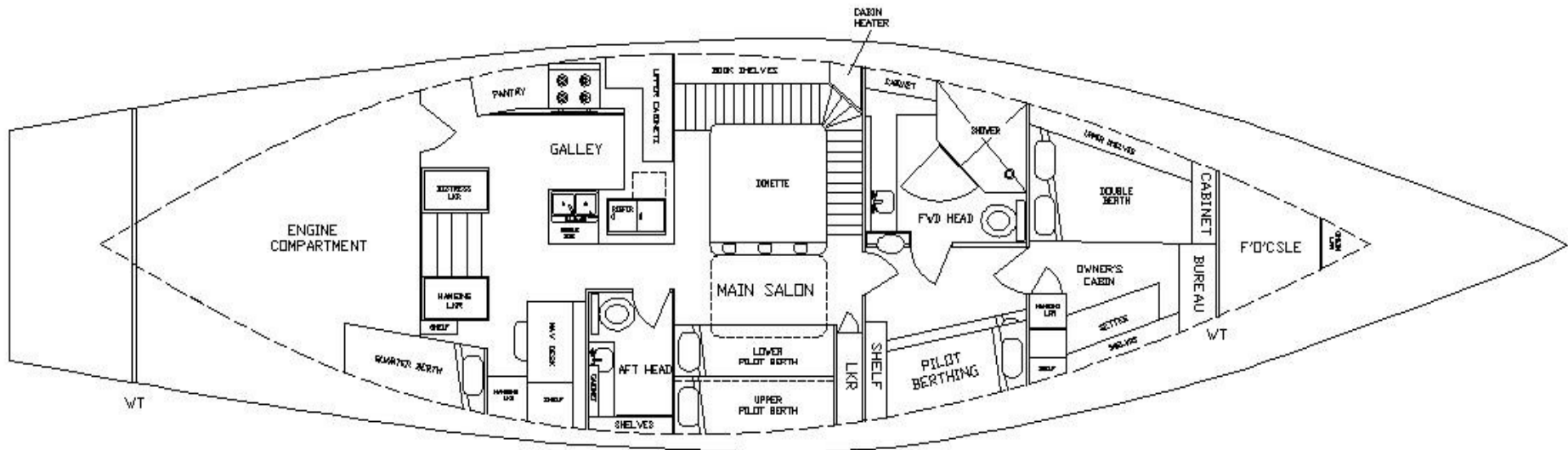


ROSAMUNDA			
LOA	60.5	LRP	46
BEAM	25	DRAWING	
DEPTH	6.7	PROFILE PLAN	
DISPLACEMENT	216		
ALL DIMENSIONS IN METERS		DRAWN BY	
LOW TIDE		A.J. GERALDI	

General Arrangements

- Comfort at sea and in port
- Adequate sea berths
- Good natural light and ventilation
- Functionality

General Arrangements



General Arrangements



Deck Plan

- Goals are to provide the following:
 - Ease of movement on deck
 - Safety
 - Comfortable cockpit for both in port and at sea use
 - Good visibility
 - Preserving the look and feel of a traditional yacht

Deck Plan

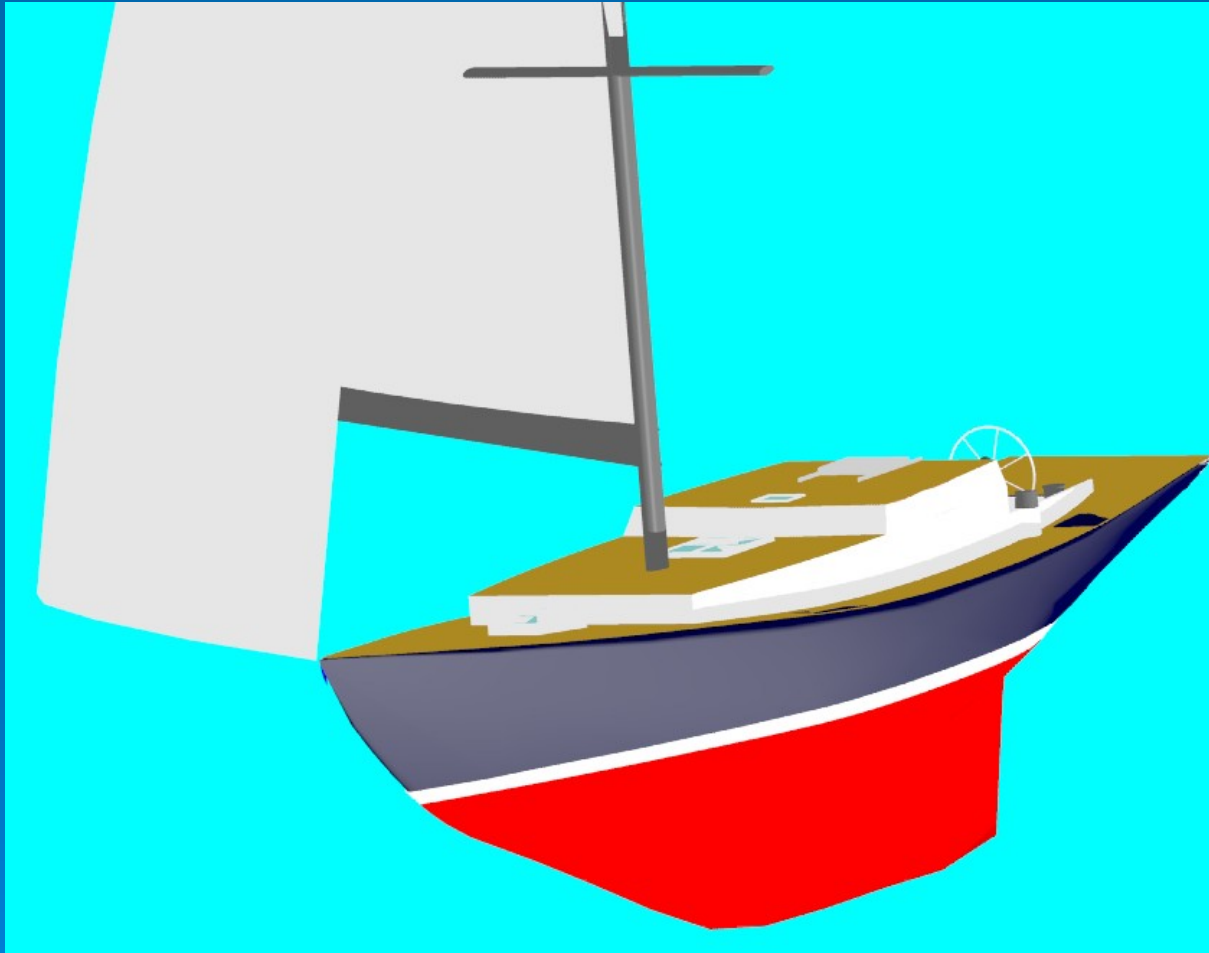
➤ MODERN CONVENIENCE:

- Self Tailing multi speed winches
- Cockpit led controls
- Travelers for main and staysail
- Easy opening low profile hatches
- Electronic displays for Navigation and performance

STRUCTURES

- BUILT To Lloyd's Rules and Regulations for the Classification of Yachts (1979)
- ISAF Special Regulations CATEGORY 1 Monohull

STRUCTURES



RIG DESIGN

- Fractional Cutter Rig
- Carbon Fiber Tapered Spar
- Two Spreaders, no running- back stays
- Double Lowers
- 1x19 wire shrouds



Rig Design

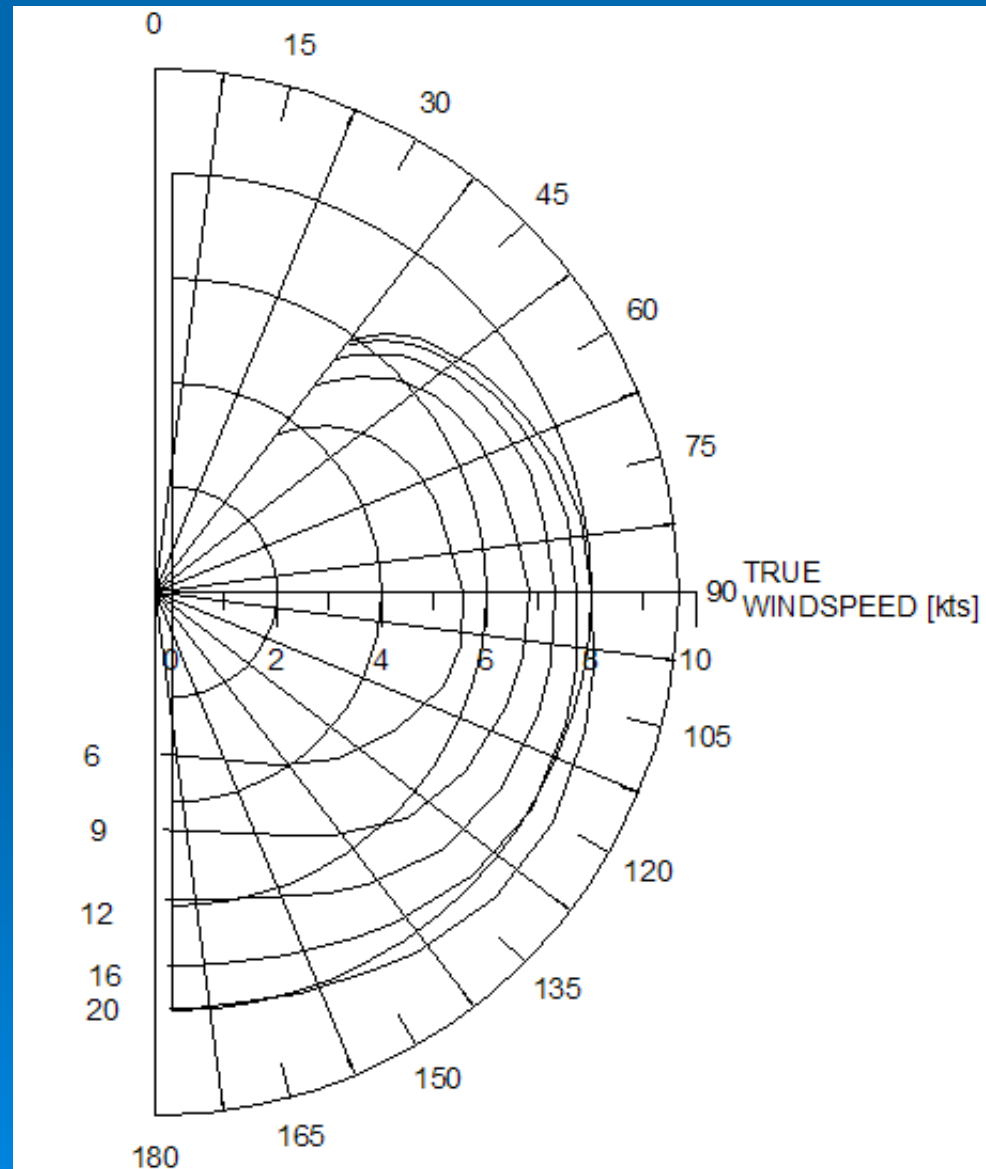
- 78' above DWL
- 31' Carbon/ Epoxy Boom w/ Spruce Veneer- finished bright
- 1122 ft² mainsail
- Staysail= 380 ft²
- Jib= 684ft²
- Total Sail Area= 2186 ft²
- SA/ Disp. Ratio= 21.51



VELOCITY PREDICTION PROGRAM

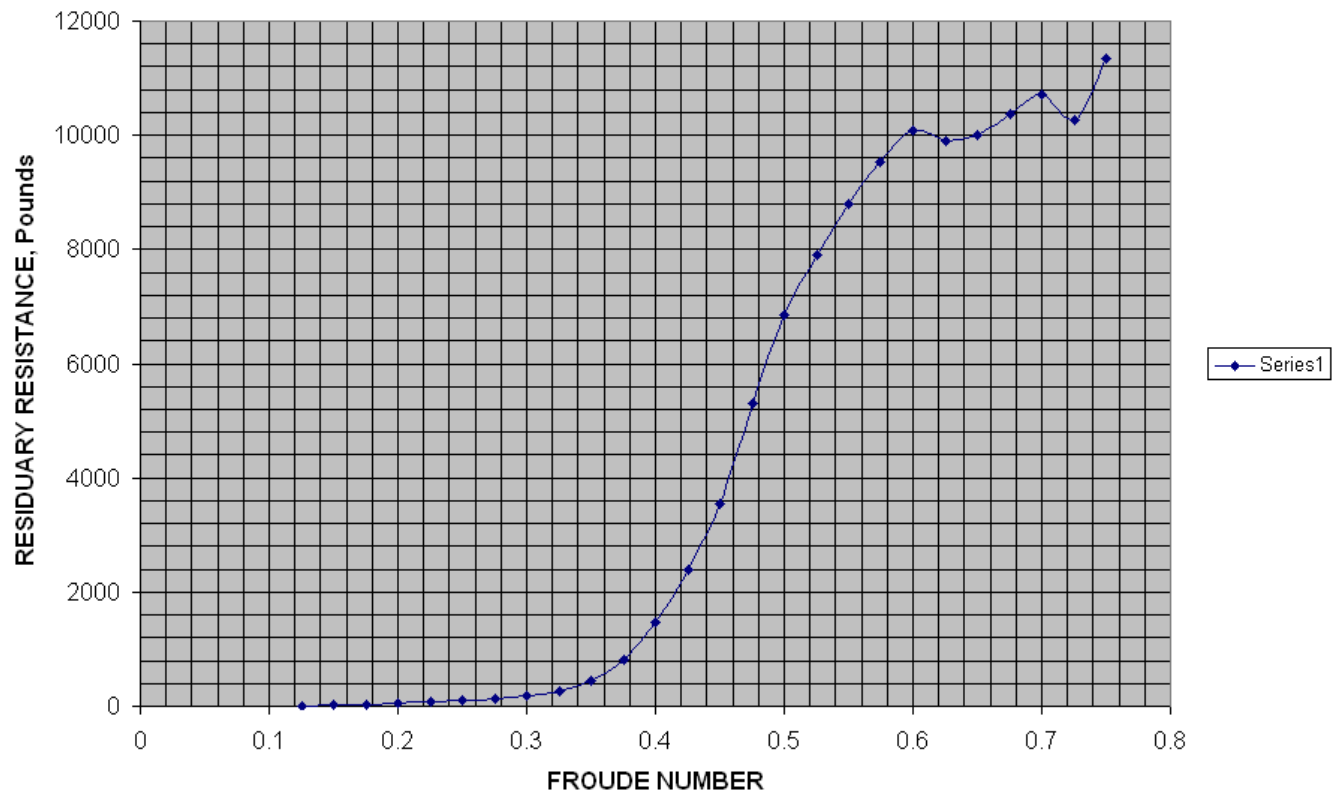
- Based on Deift 93/Lseries
- EXCEL-based Velocity Prediction Program
- 5-speeds (6,9,12,16,20 kts)
- 35 wind angles
- Calculates VMG, Apparent Boat Speed and, R_R

SAIL POLARS



RESISTANCE CURVE

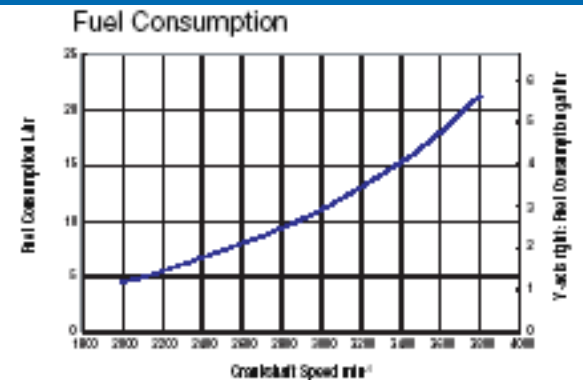
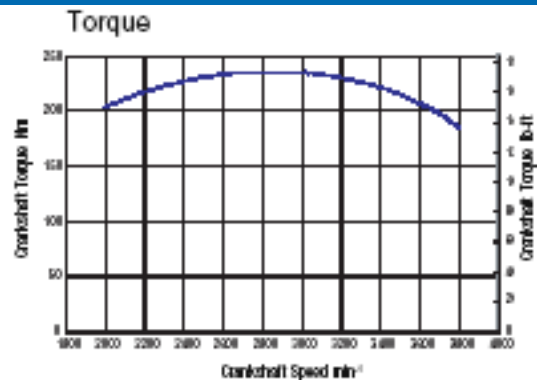
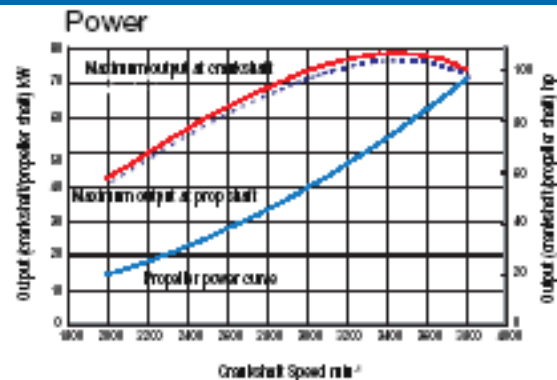
RESIDUARY RESISTANCE , DELFT 93



PROPULSION DETAILS

- Yanmar 4JH3-THE diesel engine
- Four-stroke, vertical, water-cooled
- Rated for 97 BHP @ 3800 rpm
- ZF30M Mechanical Multi-plate clutch
- 563 lbs. in dry state
- Meets BSO II, SAV & EMC std. compliance

Propulsion Details



Electrical System

- Generator: Onan 7 kW
- 5 12V Sealed Marine Batteries
- 110/220 V AC
- 12V DC
- Shore-power hookup
- Built-in Battery Charger/Alternator

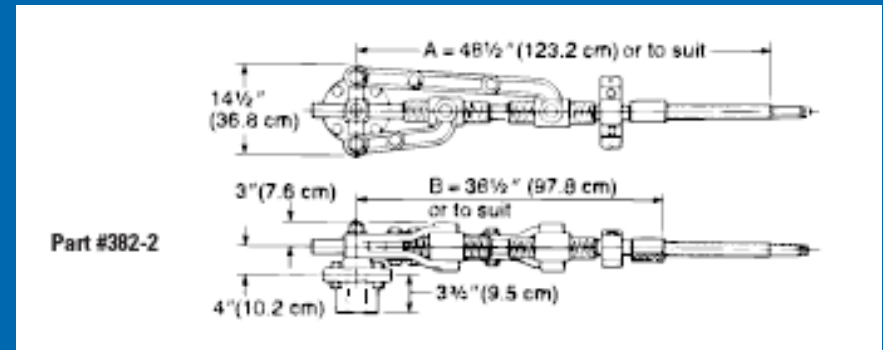


Piping

- Reverse Osmosis Fresh Water Maker
- 2-175 gal potable water tanks
- 250 gal diesel fuel tank
- 2- 30 gal holding tanks
- Automatic and Manual Bilge Pumps

Rudder and Steering

- Steering Gear: Edson Robinson Worm Gear model #380-2
- 2.5" Diameter Carbon Rudder Post
- Rudder Data:
 - Area= 19.55 ft²
 - Center of Effort= 2.7' above BL
 - Design Load= 5046 lb with FOS of 3



Further Iterations

- Engine Side Access and Spacing too tight to be practical for maintenance
 - Correct By
 - Increase Shaft Angle
 - Raise Engine in Hull
 - Move Engine Forward

- Center of Effort- Lead too small
 - Correct by:
 - Shifting Mast Forward one Diameter
 - Shifting Keel Back
 - Raising Jib Forestay

QUESTIONS?

